

LEED and Implementing a Cost Management Strategy in Laboratory Design

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It says...

**“USGBC promotes the design,
construction and operation of
buildings that are environmentally
responsible, profitable and healthy
places to live and work.”**

Yes....but....profitable??

Economic Benefits, the Hard Numbers

- ✓ **Reduce operating costs**
- ✓ **Optimize lifecycle economic performance**
- ✓ **Reduce or neutralize first costs**
- ✓ **Enhance asset value & increase profits**

Economic Benefits, the Soft Numbers

- ✓ **Improve productivity**
- ✓ **Reduce absenteeism and turnover**
- ✓ **Reduce liability**
- ✓ **Increase retail sales with daylighting**

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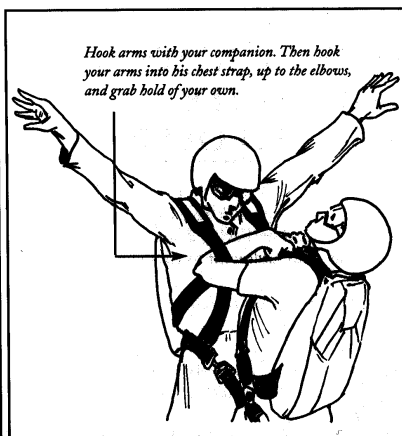
The
WORST-CASE SCENARIO
Survival Handbook



By Joshua Piven and David Borgenicht

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Hook arms with your companion. Then hook your arms into his chest strap, up to the elbows, and grab hold of your own.

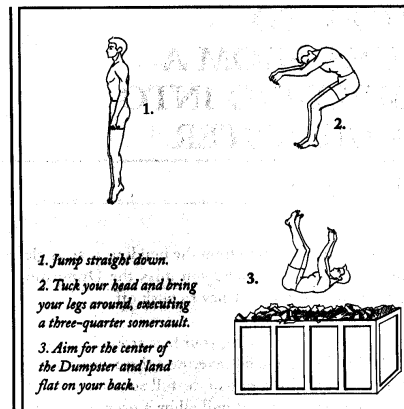
- 5** **Steer the canopy.**
Your friend must now hold on to you with one arm while steering his canopy (the part of the chute that controls direction and speed).
If your friend's canopy is slow and big, you may hit the grass or dirt slowly enough to break only a leg, and your chances of survival are high.
If his canopy is a fast one, however, your friend will have to steer to avoid hitting the ground too fast. You must also avoid power lines and other obstructions at all costs.

138. *chapter 5: adventure survival*

HOW TO SURVIVE IF YOUR PARACHUTE FAILS TO OPEN

- 1** As soon as you realize that your chute is bad, signal to a jumping companion whose chute has not yet opened that you are having a malfunction. Wave your arms and point to your chute.
- 2** When your companion (and new best friend) gets to you, hook arms.
- 3** Once you are hooked together, the two of you will still be falling at terminal velocity, or about 130 miles per hour.
When your friend opens his chute, there will be no way either of you will be able hold on to one another normally, because the G-forces will triple or quadruple your body weight. To prepare for this problem, hook your arms into his chest strap, or through the two sides of the front of his harness, all the way up to your elbows, and grab hold of your own strap.
- 4** **Open the chute.**
The chute opening shock will be severe, probably enough to dislocate or break your arms.

137. *surviving if your parachute fails to open*



Be Aware

- If the building has fire escapes or other protrusions, your leap will have to be far enough out so you miss them on your way down. The landing target needs to be far enough from the building for you to hit it.
- The Dumpster may be filled with bricks or other unfriendly materials. It is entirely possible to survive a high fall (five stories or more) into a Dumpster, provided it is filled with the right type of trash (cardboard boxes are best) and you land correctly.

78. chapter 3: leaps of faith

HOW TO JUMP FROM A BUILDING INTO A DUMPSTER

How to Jump

- 1** Jump straight down.
If you leap off and away from the building at an angle, your trajectory will make you miss the Dumpster. Resist your natural tendency to push off.
- 2** Tuck your head and bring your legs around.
To do this during the fall, execute a three-quarter revolution—basically, a not-quite-full somersault. This is the only method that will allow a proper landing, with your back facing down.
- 3** Aim for the center of the Dumpster or large box of debris.
- 4** Land flat on your back so that when your body folds, your feet and hands meet.
When your body hits any surface from a significant height, the body folds into a V. This means landing on your stomach can result in a broken back.

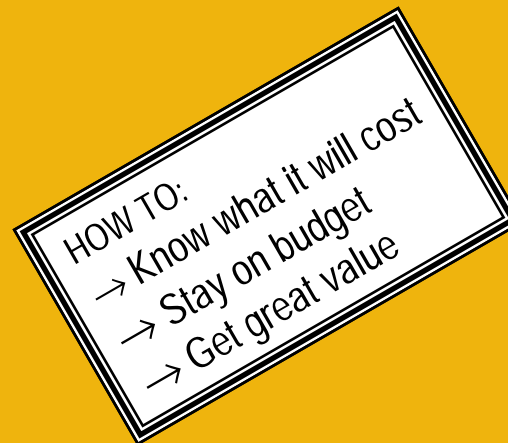
77. jumping from a building into a dumpster

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**The Owner's
WORST-CASE SCENARIO
Survival Handbook**



By Jay Shoemaker and Ian McWhinney

SURVIVAL GUIDE

- **HOW CAN OWNERS GET DEPENDABLE INFORMATION ON COST & VALUE FROM START TO FINISH?**

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SURVIVAL GUIDE

WHAT IS VALUE?

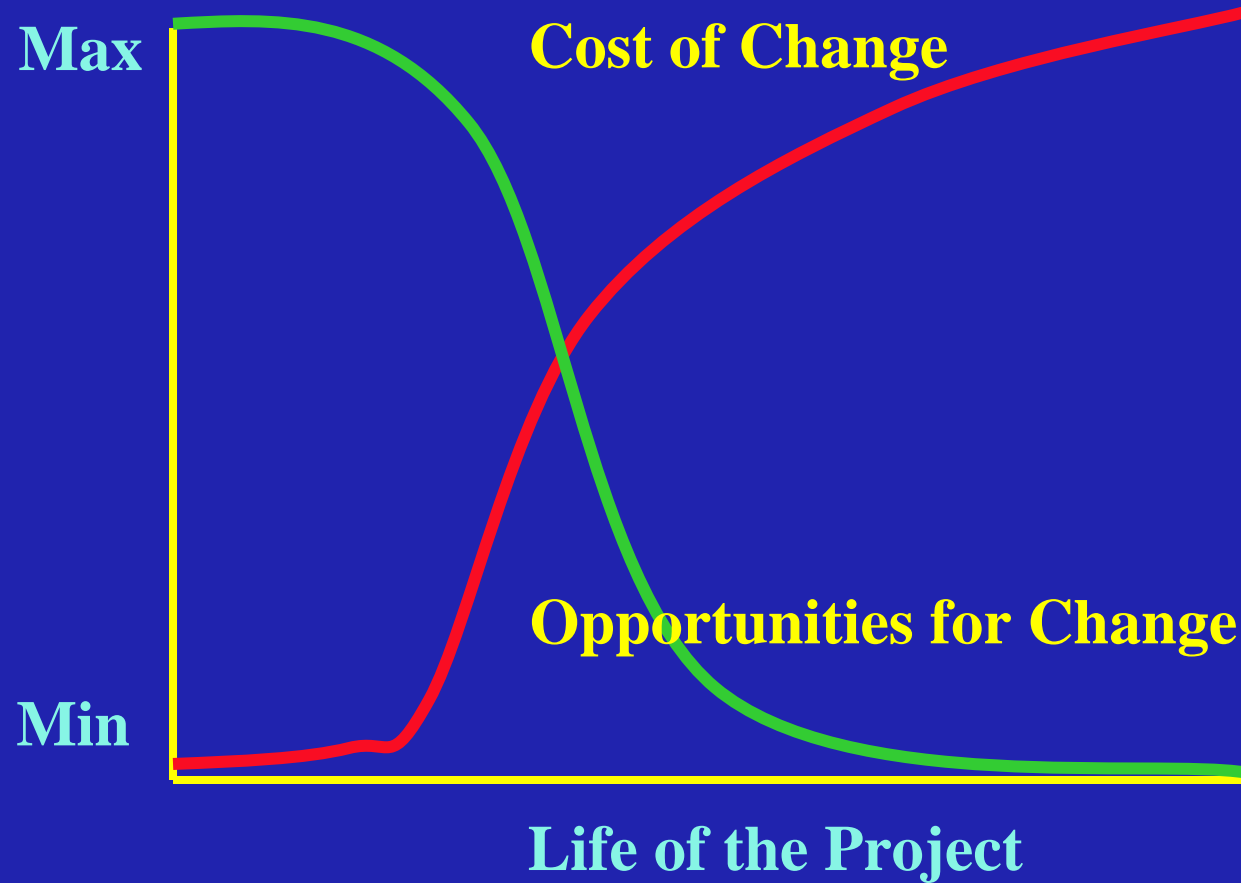
What is value?

- ✓ It's the most economical means of meeting a real need

recognizing that

- ✓ The opportunities to improve value decrease, and the costs of change increase “logarithmically” as the solution develops

Opportunity



SURVIVAL GUIDE

- **HOW DO YOU
ORGANIZE THE
DESIGN TEAM
FOR EFFECTIVE
COST
MANAGEMENT?**

How do you organize the design team for effective cost management?

- ✓ As a single team working in a flat coequal organizational structure
- ✓ With a single point of responsibility for the design and cost
- ✓ Regular design and project review meetings independent of the client
- ✓ Continuous intra-team
- ✓ Communicating a single message to the client

SURVIVAL GUIDE

- **WHAT DO WE
NEED TO KNOW
OR DO TO
PREDICT FINAL
COSTS?**

What architects, engineers and cost managers need to know or do to predict the final cost? From the client...

- ✓ Defined scope; program, criteria, etc.
- ✓ Total project budget; hard and soft
- ✓ Timely decisions
- ✓ Appreciation of major cost drivers
- ✓ Prioritization: cost vs. quality vs. time
- ✓ Strategy and schedule for project delivery

What architects, engineers and cost managers need to know or do to predict the final cost? In design...

- ✓ Early investigation of design options & development of comparative costs
- ✓ Stay focused on the primary requirements of the project
- ✓ Provide best available (best guess) information to minimize unknowns
- ✓ Continuously identify new risks
- ✓ Consider ways to improve value

What architects, engineers and cost managers need to know or do to predict the final cost? In estimating...

- ✓ **Understand where the design is headed and its history**
- ✓ **Use relevant “benchmarks”**
- ✓ **Know current and local labor and material costs, trends and conditions**
- ✓ **Continuously manage value and risk**
- ✓ **Track changes**
- ✓ **Track and trend the costs**

SURVIVAL GUIDE

- **WHAT CAN A
CLIENT EXPECT
TO KNOW, WHEN
AND WITH WHAT
ACCURACY?**

What can a client expect to know, when, and with what accuracy? Conceptual Design

- ✓ **Information:**
 - **Benchmark, unit costs from similar space types**
 - **Cost plan**
- ✓ **Cost accuracy: -15% to + 20%**
- ✓ **Risk: Identification of potential major risks**

What can a client expect to know, when, and with what accuracy? Schematic & Design Development

- ✓ **Information:**
 - **Cost plan: target budgets**
 - **Quantitative takeoff for major systems and features**
 - **Value management**
- ✓ **Cost accuracy: -10% to + 15%**
- ✓ **Risk: Quantitative analysis; assessment: major components; contingency: initial allocation**

What can a client expect to know, when, and with what accuracy? During preparation of Construction Docs

✓ Information:

- **Design & cost plan fully integrated**
- **Detailed quantitative takeoff**
- **Procurement plan**

✓ Cost accuracy: -5% to + 5%

✓ Risk: Quantitative analysis; final mitigation action; final allocation of contingency

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WHAT FACTORS INFLUENCE THE ACCURACY OF AN ESTIMATE?

Factors influencing the accuracy of an estimate: Scope

- ✓ **Change: additions and omissions**
- ✓ **Client's ability to manage their requirements including providing detailed information**
- ✓ **Continuous focus on the original scope of the project**
- ✓ **A design that is consistently and iteratively developed**

Factors influencing the accuracy of an estimate: Timing

- ✓ **Sufficient time to develop quality information**
- ✓ **Timely decisions**
- ✓ **Construction schedule and project phasing**

Factors influencing the accuracy of an estimate: Other

- ✓ Safety, protocols, local conditions, site restrictions, etc.
- ✓ Procurement and buyout strategy
- ✓ Type and quality of construction documentation
- ✓ Market conditions!!!!!!!!!!!!!!!!!!!!
- ✓ Risk!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

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- **HOW DO WE
MANAGE RISK,
HENCE WHAT IS
CONTINGENCY?**

What is risk?

- ✓ It's what can't be well defined or quantified with a degree of certainty
or
- ✓ “Certainties” that have a reasonable probability of changing

What is contingency?

- ✓ Contingency is money in the construction budget that may be required to offset the inherent risks within the design, bidding and construction process

said another way

- ✓ It is the money that will be required to pay for what is unknown or poorly defined

How do we manage risks, hence what is
“contingency” and how is it allocated?
Firstly...

✓ **NO!!!! project is
risk free!!!!**

✓ It can't be ignored

✓ It **can** be managed

How do we manage risks, hence what is “contingency” and how is it allocated?

- ✓ Risk requires systematic and continuous management: identification, assessment & mitigation programs
- ✓ Amount of contingency required at each stage results from a quantitative analysis of current best information
- ✓ Contingency is allocated to divisions
- ✓ Contingency is “spent” when over-budget costs can’t be reduced

How do we manage risks, hence what is “contingency” and how is it allocated? Managing risk requires...

- ✓ Trust & mutual respect between architects and engineers and cost managers
- ✓ The continuous “shoulder-to-shoulder” involvement of the cost managers in the design of the project
- ✓ Open, candid and clear intra-team communication

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 **WHAT CAN WE
DO TO HELP
CLIENTS
MANAGE COST?**

What can we do to help clients manage costs?

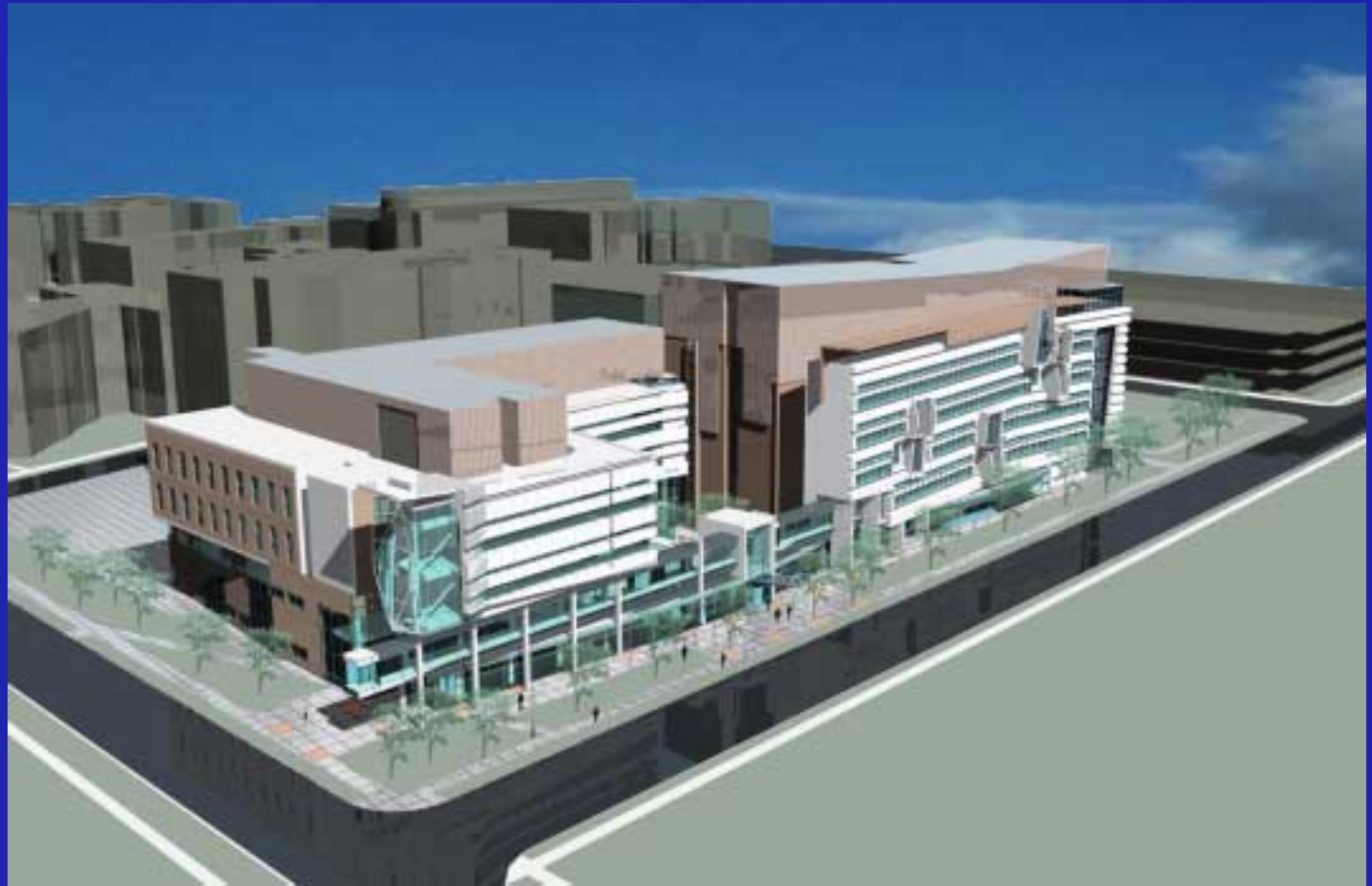
Help them to ...

- ✓ **Understand the costs and what is driving them**
- ✓ **Understand their options**
- ✓ **Make sound and timely decisions**
- ✓ **Understand and manage risk**
- ✓ **Understand opportunities for value & any associated downsides**

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Case Study

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Case Study

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- ✓ Three clients !!!!
- ✓ 311,000 GSF
 - Wet labs: 185,500 GSF
 - Bioinformatics labs: 53,200 GSF
- ✓ Cost:
 - Budget: \$84.8mm
 - Current: \$80.2 w/ 7.6% design contingency, plus \$2.4mm VM

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Key Cost Management Successes:

- ✓ **Team effort early & with the 3 owners**
- ✓ **Strong leadership & thorough planning**
- ✓ **Clear statement of needs: “world class” image, but with high efficiency & value**
- ✓ **Options (design and VM) with cost models (yes, it cost time and money); no back-tracking or redesign**
- ✓ **Detailed above & below line budgets**
- ✓ **Trackable estimate from the start, built from \$/SF (net and gross) to quantities**

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LEED Cost Implications:

- ✓ **Increased first cost; ~ 5%**
 - ❖ **Lack of competition, fewer sources**
 - ❖ **More expensive materials & systems**
- ✓ **Increased design cost (on the boards)**
- ✓ **Cost of documenting for certification**
 - ❖ **Design team**
 - ❖ **Construction**
- ✓ **Increased General Conditions cost**
- ✓ **Additional modeling and analysis**

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LEED Cost Management:

- ✓ **Client commitment & funding!!!!**
- ✓ **Committed & knowledgeable design team and CM**
- ✓ **Estimate ALL costs including tracking and accounting during construction**
- ✓ **Quantify life-cycle benefits**
- ✓ **Larger contingencies for LEED items until multiple sources or methods are validated**
- ✓ **Don't speculate, prove it!**

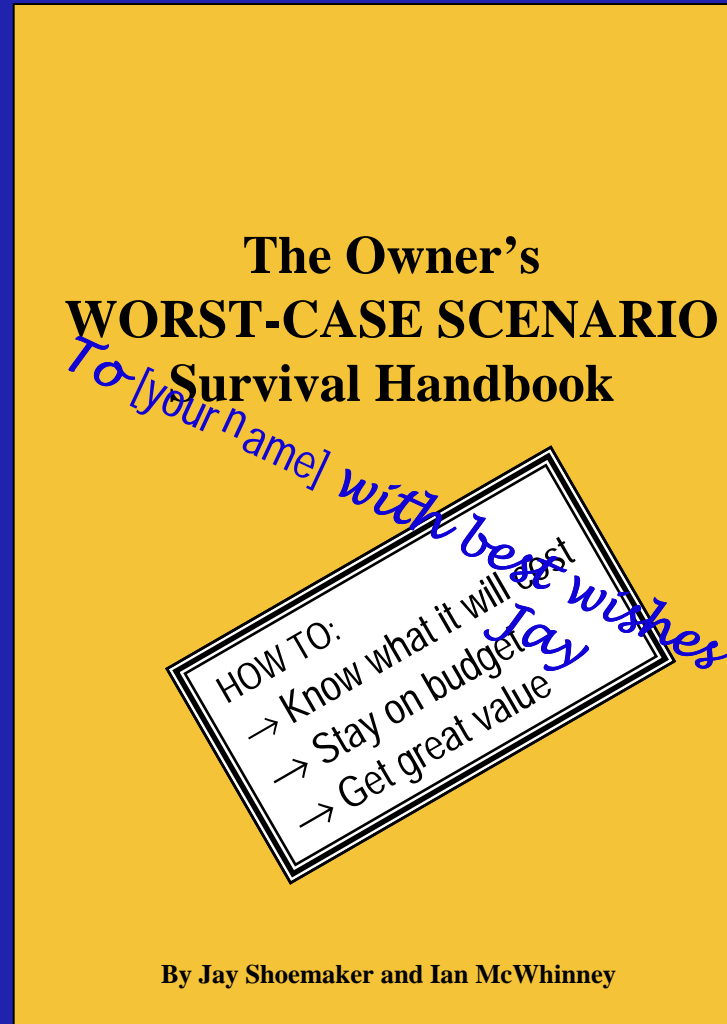
Take-home: to achieve the economic benefits of LEED, (hard and soft cost) cost management approach provides:

- ✓ **Understanding of & buy-in on all costs**
- ✓ **Analysis of cost benefits (quantitative and qualitative)**
- ✓ **Integrated management of cost & design**
- ✓ **Team commitment to make it as easy and as successful as possible**

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